IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

In re Patent Application of	Confirmation No. 5863
BETTONVILLE et al	Atty. Ref.: LCM-4702-38
Serial No. 10/561,796	TC/A.U.: 1974
Filed: December 21, 2005	Examiner: Wood, E.S.
For: POLYETHYLENE PIPE RESINS	

* *

February 10, 2010

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

Sir:

Appellant hereby **appeals** to the Board of Patent Appeals and Interferences from the last decision of the Examiner.

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(I) REAL PARTY IN INTEREST

The real party in interest is Ineos Manufacturing Belgium NV, a corporation of Belgium.

(II) RELATED APPEALS AND INTERFERENCES

The appellant, the undersigned, and the assignee are not aware of any related appeals, interferences, or judicial proceedings (past or present), which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

(III) STATUS OF CLAIMS

Claims 1-10, 12 and 13 are pending and have been rejected. Claim 11 is canceled.

No claims have been substantively allowed. Claims 1-10, 12 and 13 are appealed.

(IV) STATUS OF AMENDMENTS

An amendment was filed on April 4, 2009 and, according to the Advisory Action mailed April 24, 2009, will be entered for appeal purposes .

(V) SUMMARY OF CLAIMED SUBJECT MATTER

The invention of claim 1 relates to a pressure pipe polyethylene resin (specification, page 1, lines 1-2; page 2, lines 22-23). The resin comprises from 90 to 99.9 wt%, based on the total weight of the resin, of a polyethylene (specification, page 2, line 25), and from 0.1 to 10 wt%, based on the total weight of the blend, of an ionomer (specification, page 2, lines 26-27).

The invention of claim 9 relates to a pressure pipe comprising a resin as defined in claim 1 (specification, page 1, line 4; page 6, line 19).

(VI) GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The ground of rejection to be reviewed on appeal is whether claims 1-10 and 12-13 are unpatentable over Dupire *et al*. (EP1201711) in view of Funaki *et al*. (US 2004/0191440). This is the sole ground of rejection to be reviewed on appeal.

(VII) ARGUMENT

I. THE REJECTION

In a first aspect, claims 1-8, 12 and 13 directed to a pressure pipe resin stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Dupire *et al.* (EP1201711, hereinafter "Dupire") in view of Funaki *et al.* (US 2004/0191440, hereinafter "Funaki"). In a second aspect, claims 9 and 10, directed to a pressure pipe, stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over Dupire in view of Funaki.

The Action asserts that it would have been obvious to one of ordinary skill in the art to combine the polyethylene pipe resin of Dupire with the ionomer polymer of Funaki to produce a pipe that has increased impact resistance while maintaining the standards of pressure pipes. This assertion is erroneous. Reversal of the obviousness rejection is respectfully requested.

II. REBUTTAL

(a) Claims 1-8 and 12-13 - Resin

As claimed in claim 1, there is provided a pressure pipe polyethylene resin. The resin comprises from 90 to 99.9 wt%, based on the total weight of the resin, of a polyethylene, and from 0.1 to 10 wt%, based on the total weight of the blend, of an ionomer.

By way of introduction, the present invention is concerned with polyethylene pipe resins and pressure pipes fabricated therefrom. The specification defines a pressure pipe as "a pipe having a pressure rating of PE 80 and above" (page 1, lines 22-23). The PE 80 rating is explained in the description, and essentially defines any pipe which can

withstand a hydrostatic pressure of at least 8MPa for 50 years at 20°C (page 2, lines 1-5). Such high pressure pipes are typically used for transporting gas, and PE 80 is a high level performance standard which is required in the industry.

The surprising discovery underlying the present invention is that addition of an ionomer to polyethylene used in pressure pipes gives rise to improvement in the long-term creep performance of the polyethylene, and can therefore result in pressure pipes with improved properties. This discovery is not suggested by Dupire and Funaki, either when taken singly or in combination.

Dupire relates to polyethylene resins especially suited for use as pipe resins (page 1, lines 3-4). Dupire further states that the invention relates to the use of polyethylene resins for the manufacture of pipes (page 1, lines 4-5). Dupire additionally states that invention relates to polyethylene pipes (page 1, line 5). The resin is said to have good resistance to slow crack growth and improved long-term creep performance (page 5, lines 24 and 42). However, Dupire is silent (as admitted in the Action) with regard to the use of an ionomer.

The Action asserts that it would have been obvious to combine the resin of Dupire with the ionomer polymer of Funaki to produce a pipe that has increased impact resistance while maintaining the standards of pressure pipes (Action, page 3). This assertion is respectfully traversed.

Funaki relates to fuel hoses for automobiles, not pressure pipes. There is no suggestion in Funaki of physical properties such as long-term creep and resistance to slow crack growth which are important for pressure pipes. Funaki provides a discussion

of low-temperature impact resistance, but this is **not** a significant issue for a pressure pipe which spends its life underground.

Furthermore, Funaki does not improve the impact resistance by specifically adding an ionomer. Rather, impact resistance is improved by adding a rubbery polymer (see para [0080]) which may itself contain an ionomer. It is actually the rubbery nature of the added polymer that is improving the impact resistance (by giving the pipe a degree of flexibility to absorb impact), rather than the ionomer *per se*. Funaki, therefore, does **not** inform or suggest to the skilled person anything about whether or not the addition of ionomers would improve the performance of pressure pipes. In fact, adding a rubbery polymer to a pressure pipe resin is more likely to reduce the long term creep properties than improve them, as it is likely to soften the pipe.

Based on the above, it is clear that one of ordinary skill in the art would not have been motivated to combine a polyethylene pipe resin as disclosed in Dupire with an ionomer as described in Funaki, as the skilled person would not have had any reasonable expectation that the incorporation of an ionomer, disclosed by Funaki in the context of an automobile hose, would have had any beneficial effect in regard to a pressure pipe resin. A pressure pipe fulfilling the above definition is completely different from a hose used in automobiles, as disclosed by Funaki. The fact that a resin can be made into a "pipe", such as for use in automobiles, gives no information to the skilled artisan about whether it would be suitable for use as a "pressure pipe". It is clear, therefore, that no *prima facie* case of obviousness of the claimed subject matter of resin claims 1-8, 12 and 13 is generated by the combined disclosures of Dupire and Funaki.

Additionally, important properties for pressure pipes include long term creep resistance because they have to be able to withstand sustained pressures, often underground, for many years. This long term creep resistance is one of the factors which contributes to the rating of a pressure pipe as "PE80" or "PE100". Other factors are resistance to slow crack growth (ESCR) and resistance to rapid crack propagation. Impact resistance is not considered a significant issue. Without a "PE80" or "PE100" rating, a pipe is not considered suitable for this application. The solid state creep results described in the Examples of the present application are linked to long term creep resistance. As will be clear from the discussion below, the Examples of the present application establish that the addition of an ionomer clearly results in a surprising improvement.

The metallocene resins B and C used in the Examples thereof were made as described in WO 02/34829. WO 02/34829 is EP 1201713A, and is a "sister" application of Dupire, with the same inventors. The resins disclosed in the two applications are very similar. Thus, while the Examples in the present application do not show the effect of adding ionomer to the resins of Dupire, they do show the effect of adding ionomer to **almost identical** resins.

The present Examples show clearly that addition of ionomer results in an improvement in creep resistance. Surprisingly, the largest improvement is present at lower levels of ionomer. This phenomenon is not disclosed or suggested by Dupire, taken alone or in combination with Funaki.

Summarizing, one of ordinary skill, as of the filing date of the present application, would not have been motivated to combine Funaki with Dupire, because Funaki, being

limited to fuel hoses, would not have lead the person of ordinary skill to a reasonable expectation that addition of an ionomer in a pressure pipe would improve the performance of the pressure pipe. Funaki provides no motivation or information with regard to question of whether or not it would have been obvious to one of ordinary skill to add an ionomer to polyethylene used for fabrication of a pressure pipe. The surprising results observed when an ionomer is incorporated into the polyethylene pipe resin, as discussed above, further support patentability of the claimed pipe resins over the cited Dupire and Funaki references. Reversal of the obviousness rejection as applied to resin claims 1-8, 12 and 13 is respectfully requested.

(b) <u>Claims 9-10 – Pressure Pipe</u>

Claim 9 claims a pressure pipe comprising a resin as define in claim 1. Claims 9 and 10 are rejected as unpatentable over Dupire and Funaki for the same reasons as claims 1-8, 12 and 13.

In reply, the person of ordinary skill, as of the filing date of the present application, would not have been motivated to arrive at the claimed pressure pipe for the same reasons as argued above in relation to the claims to the pipe resin. Dupire relates to polyethylene resins especially suited for use as pipe resins (page 1, lines 3-4) but makes no mention of the use of an ionomer. Funaki does mention ionomers but relates to fuel hoses for automobiles, **not** pressure pipes. Also, Funaki does not improve the impact resistance by specifically adding an ionomer, but by adding a rubbery polymer ([0080]) which may contain an ionomer. As noted earlier, it is the rubbery nature of the added polymer that improves the impact resistance by imparting a degree of flexibility to absorb impact. Funaki, therefore, does **not** inform or suggest to the skilled person anything

about whether or not the addition of ionomers would improve the performance of pressure pipes. Indeed, addition of a rubbery polymer to a pressure pipe resin would be more likely to soften then pipe and reduce the long term creep properties than improve them.

Based on the above, one of ordinary skill would not have been motivated to combine Dupire and Funaki in regard to the invention as claimed in pressure pipe claims 9 and 10. Reversal of the outstanding obviousness rejection as applied to pressure pipe claims 9 and 10, as well as resin claims 1-8, 12 and 13, is respectfully requested.

CONCLUSION

The application is in clear condition for allowance. Reversal of the Final Rejection and passage of the subject application to issue are earnestly solicited.

Respectfully submitted,

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(VIII) CLAIMS APPENDIX

1. Pressure pipe resin comprising from 90 to 99.9 wt%, based on the total weight of the resin, of a polyethylene, and from 0.1 to 10 wt%, based on the total weight of the blend, of an ionomer.

2. Pressure pipe resin according to claim 1, wherein the polyethylene is multimodal.

3. Pressure pipe resin according to claim 2, formed from a blend of (a) a polyethylene resin comprising from 35 to 60 wt% of a high molecular weight fraction having a density of up to 0.930 g/cm^3 and from 40 to 65 wt% of a low molecular weight fraction having a density of at least 0.965 g/cm^3, and (b) from 0.1 to 10 wt%, based on the total weight of the blend, of an ionomer.

4. Pressure pipe resin according to claim 1, wherein the quantity of ionomer in the blend is between 0.5 and 6 wt% based on the total weight of the blend.

5. Pressure pipe resin according to claim 4, wherein the quantity of ionomer in the blend is between 1 and 2 wt% based on the total weight of the blend.

6. Pressure pipe resin according to claim 1, wherein the ionomer has a polyethylene backbone and has a density of at least 0.930 g/cm^3.

7. Pressure pipe resin according to claim 1, wherein the ionomer is a grafted metal salt of an ethylene and maleic anhydride copolymer.

8. Pressure pipe resin according to claim 1, wherein the polyethylene resin comprises from 35 to 49 wt% of a first polyethylene fraction of high molecular weight, and from 51 to 65 wt% of a second polyethylene fraction of low molecular weight, the first polyethylene fraction comprising a linear low density polyethylene having a density of up to 0.928 g/cm^3 and an HLMI of less than 0.6g/10min, and the second polyethylene fraction comprising a high density polyethylene having a density of at least 0.969g/cm^3 and an MI_2 of greater than 100g/10min, and the polyethylene resin having a density of greater than 0.940g/cm^3 and an HLMI of from 1 to 100 g/10min.

9. Pressure pipe comprising a resin as defined in claim 1.

10. Pressure pipe according to claim 9, which has an extrapolated 20°C / 50 years stress at a 97.5% confidence level of at least 10 MPa (PE 100) according to ISO 9080.

12. Pressure pipe resin according to claim 2, wherein the polyethylene is bimodal.

13. Pressure pipe resin according to claim 4, wherein the quantity of ionomer in the blend is between 1 and 5 wt%.

(IX) EVIDENCE APPENDIX

None.

(X) RELATED PROCEEDINGS APPENDIX

None.